Damage Assessment on Frame Structure with Bolted Joints based on Experimental Modal Analysis

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Abstract.
Bolted joint commonly being used as a mechanical joint to connect two or more mechanical components which bring an interest to this study. The complexity of joint element plays an important role in the dynamic investigation. This paper aims to study the differences between undamaged and damage frame structure with the bolted. Frame structure consists of 4 angle bar and 16 flat bars fabricated with stainless steel material is used. Total of 32 pcs of M6 screw and nuts are used together with structure. However, damage can lead to disaster which usually happen either on the frame or on the join itself. Damage often alter the mode shapes and reduce the natural frequencies. Natural frequencies and mode shapes of both undamaged and damaged data obtained by experimental modal analysis is correlated. Frequency drop is observed on natural frequencies after being correlated and as well as the mode shapes changed occurs on the undamaged and damages structure. Frame structure with damage on the joints able to detect the frequency drops and alter the modes shapes.